

Investigation

2

Quadratic Expressions

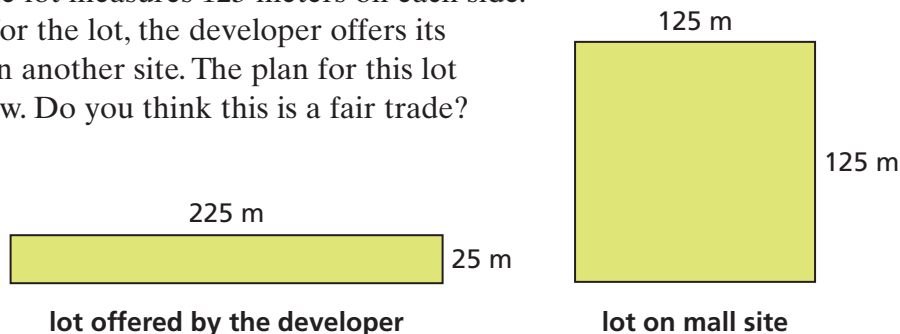
Suppose you give a friend two \$1 bills, and your friend gives you eight quarters. You would consider this a fair trade. Sometimes it is not this easy to determine whether a trade is fair.



2.1 Trading Land

Getting Ready for Problem 2.1

- A developer has purchased all of the land on a mall site except for one square lot. The lot measures 125 meters on each side. In exchange for the lot, the developer offers its owner a lot on another site. The plan for this lot is shown below. Do you think this is a fair trade?



In this problem, you will look at a trade situation. See if you can find a pattern that will help you make predictions about more complex situations.

Problem 2.1 Representing Areas of Rectangles

Suppose you trade a square lot for a rectangular lot. The length of the rectangular lot is 2 meters greater than the side length of the square lot, and the width is 2 meters less.

A. 1. Copy and complete the table.

Original Square		New Rectangle			Difference in Areas (m ²)
Side Length (m)	Area (m ²)	Length (m)	Width (m)	Area (m ²)	
2	4	4	0	0	4
3	9	5	1	5	4
4	■	■	■	■	■
5	■	■	■	■	■
6	■	■	■	■	■
n	■	■	■	■	■

2. Explain why the table starts with a side length of 2 meters, rather than 0 meters or 1 meter.

3. For each side length, tell how the areas of the new and original lots compare. For which side lengths, if any, is the trade fair?

B. 1. Write an equation for the relationship between the side length n and the area A_1 of the original lot.

2. Write an equation for the relationship between the side length n of the original lot and the area A_2 of the new lot.

3. Carl claims there are two different expressions for the area of the new lot. Is this possible? Explain.

C. 1. On the same axes, sketch graphs of the area equations for both lots. For the independent variable, show values from -10 to 10 . For the dependent variable, show values from -10 to 30 .

2. For each graph, tell which part of the graph makes sense for the situation.

3. Describe any similarities and differences in the two graphs.

D. Are either of the relationships quadratic relationships? Explain.

ACTE Homework starts on page 30.